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EXAMINER	
CURS, NATHAN M	
ART UNIT	**PAPER NUMBER**
2633	

DATE MAILED: 12/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	**Application No.** 10/041,853	**Applicant(s)** WAY, DAVID G.	
	Examiner Nathan Curs	**Art Unit** 2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 January 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☒ Claim(s) *10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *20020107*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 10 objected to because of the following informalities: the phrase "configuring the dispersion enhancement module routing optical signals from the transport fiber though" should be "wherein configuring the dispersion enhancement module comprises routing optical signals from the transport fiber through". Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3, 8 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Colbourne et al. (US Patent No. 6654564).

Regarding claim 1, Colbourne et al. disclose a dispersion compensation system comprising: a dispersion compensation module (DCM) operable to receive optical input and provide optical output having a negative dispersion relative to the optical input (fig. 13b, element R3 and fig. 19, element 192) and a dispersion enhancement module (DEM) adapted to be optically coupled between the DCM and an optical fiber having a positive dispersion (fig. 13b, element R1 and fig. 19, element 191), the DEM operable to selectively increase the positive dispersion provided by the optical fiber by any of a plurality of amounts and to provide the

optical input to the DCM, the optical input having a positive dispersion substantially equal to the positive dispersion of the optical fiber plus a selected one of the amounts of dispersion in the DEM (col. 1, lines 7-9 and lines 18-27, and col. 4, lines 31-61 and col. 9, line 64 to col. 10, line 61).

Regarding claim 2, Colbourne et al. disclose the dispersion compensation system of claim 1, wherein a magnitude of the positive dispersion of the optical input is substantially equal to a magnitude of the negative dispersion of the DCM, such that the optical output has a dispersion near to zero (col. 4, lines 31-61).

Regarding claim 3, Colbourne et al. disclose the dispersion compensation system of claim 1, wherein the DCM is designed to compensate for dispersion along a fixed length of an optical fiber type, the optical fiber type having a positive dispersion per unit length and wherein, if the optical fiber coupled to the DEM has an actual length less than the fixed length, the selected amount of dispersion in the DEM increases dispersion by an amount substantially equal to dispersion resulting from a length of the optical fiber type equal to the difference of the fixed length and the actual length (col. 1, lines 7-9 and lines 18-27 and col. 4, lines 31-61).

Regarding claim 8, Colbourne et al. disclose the dispersion compensation system of claim 1, wherein the DEM comprises a controller operable to: determine the negative dispersion of the DCM; determine the positive dispersion of the optical fiber; and determine the selected one of the amounts of dispersion in the DEM to provide the optical input having a positive dispersion substantially equal to an inverse of the negative dispersion of the DCM (col. 11, lines 3-22).

Regarding claim 9, Colbourne et al. disclose a method for dispersion compensation comprising: providing an optical transport fiber coupling a first network element and a second network element, the transport fiber having a first positive dispersion (col. 1, lines 7-9 and lines

18-27); providing a dispersion enhancement module disposed between the transport fiber and the second network element (fig. 13b, element R1 and fig. 19, element 191); determining a negative dispersion of the second network element (col. 11, lines 3-22); and configuring the dispersion enhancement module to provide second positive dispersion, the sum of the first positive dispersion and the second positive dispersion substantially equal to the magnitude of the negative dispersion (col. 4, lines 31-61 and col. 9, line 64 to col. 10, line 61).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Colbourne et al. (US Patent No. 6654564).

Regarding claim 5, Colbourne et al. disclose the dispersion compensation system of claim 1, and disclose one of the compensators having a fixed dispersion compensation value (col. 4, lines 53-61), and disclose dispersion compensation fiber having a fixed dispersion compensation value (col. 9, lines 12-14), but do not disclose that the DCM comprises dispersion compensation fiber having a defined negative dispersion per unit length. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to use only one tunable etalon, for the DEM, coupled with fixed dispersion compensation fiber DCM, since dispersion compensation fiber is conventional and since the etalons of Colbourne require

dimensions and free spectral range that are dependent on channel spacing of a multi-wavelength signal.

Regarding claim 11, Colbourne et al. disclose the method claim 9, and disclose open of the compensators having a fixed dispersion compensation value (col. 4, lines 53-61), and disclose dispersion compensation fiber having a fixed dispersion compensation value (col. 9, lines 12-14), but do not disclose that the negative dispersion in the second network element results from dispersion compensation fiber having a defined negative dispersion per unit length. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to use only one tunable etalon, for the DEM, coupled with fixed dispersion compensation fiber DCM, since dispersion compensation fiber is conventional and since the etalons of Colbourne require dimensions and free spectral range that are dependent on channel spacing of a multi-wavelength signal.

6. Claims 4, 6, 7, 10, 13-17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Colbourne et al. (US Patent No. 6654564) in view of Ishikawa (US Patent Application Publication No. 2002/0003646).

Regarding claim 4, Colbourne et al. disclose the dispersion compensation system of claim 1, but do not disclose that the DCM is disposed between a first optical amplifier and a second optical amplifier, the first optical amplifier optically coupled to the DEM and operable to receive the optical input from the DEM, to optically amplify the optical input, and to provide the amplified optical input to the DCM. Ishikawa discloses a variable dispersion compensation device using switched DCFs and fixed DCFs over various positive and negative compensation values (fig. 1 and fig. 13 and paragraph 0072). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the fixed and variable dispersion compensation

devices of Ishikawa for the fixed and variable compensators of Colbourne et al. since dispersion compensation fiber is conventional and since the etalons of Colbourne require dimensions and free spectral range that are dependent on channel spacing of a multi-wavelength signal. Ishikawa disclose a variable dispersion compensator at a node, where an amplifier is used in conjunction with the compensator to amplify the received signal after the signal has traveled a length of fiber (fig. 10 and paragraphs 63-65). It would have been obvious to one of ordinary skill in the art at the time of the invention to place an amplifier with the compensator of Colbourne et al. in order to amplify the received signal after the signal has traveled a length of fiber. Further it would have been obvious to one of ordinary skill in the art at the time of the invention to place an additional amplifier after the second DCF compensator taught by Ishikawa since DCF fiber is also a length of fiber that contributes loss to the signal.

Regarding claim 6, Colbourne et al. disclose the dispersion compensation system of claim 1, but do not disclose that the DEM comprises a plurality of dispersion enhancement fibers each having a defined positive dispersion per unit length, each of the dispersion enhancement fibers having a different length. Ishikawa discloses a variable dispersion compensation device using switched DCFs over various positive and negative compensation values (fig. 13 and paragraph 0072). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the variable dispersion compensation device of Ishikawa for the variable compensator of Colbourne et al. since dispersion compensation fiber is conventional and since the etalons of Colbourne require dimensions and free spectral range that are dependent on channel spacing of a multi-wavelength signal.

Regarding claim 7, the combination of Colbourne et al. and Ishikawa disclose the dispersion compensation system of claim 6, wherein the DEM is operable to selectively couple one or more of the dispersion enhancement fibers together to form an optical path coupling the

optical fiber to the DCM through the selected one or more of the dispersion enhancement fibers (Ishikawa: fig. 13 and paragraph 0072).

Regarding claim 10, the combination of Colbourne et al. and Ishikawa disclose the method claim 9, wherein configuring the dispersion enhancement module comprises routing optical signals from the transport fiber though one or more dispersion enhancement fibers (Ishikawa: fig. 13 and paragraph 0072).

Regarding claim 13, Colbourne et al. disclose a dispersion compensation system comprising: a dispersion compensation device (fig. 13b, element R3 and fig. 19, element 192) and a dispersion enhancement module (DEM) (fig. 13b, element R1 and fig. 19, element 191) adapted to be optically coupled to an optical fiber having a positive dispersion and to receive an optical input from the optical fiber, the DEM operable to selectively increase the positive dispersion provided by the optical fiber by any of a plurality of amounts, the optical input having a positive dispersion substantially equal to the positive dispersion of the optical fiber plus a selected one of the amounts of dispersion in the DEM (col. 1, lines 7-9 and lines 18-27, and col. 4, lines 31-61 and col. 9, line 64 to col. 10, line 61). Colbourne et al. do not disclose a first optical amplifier and a second optical amplifier and a dispersion compensation fiber optically coupled between the first optical amplifier and the second optical amplifier, the dispersion compensation fiber operable to receive optical input from the first optical amplifier and provide optical output to the second optical amplifier, the optical output having a negative dispersion relative to the optical input. Ishikawa discloses a variable dispersion compensation device using switched DCFs and fixed DCFs over various positive and negative compensation values (fig. 1 and fig. 13 and paragraph 0072). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the fixed and variable dispersion compensation devices of Ishikawa for the fixed and variable compensators of Colbourne et al. since dispersion

compensation fiber is conventional and since the etalons of Colbourne require dimensions and free spectral range that are dependent on channel spacing of a multi-wavelength signal. Ishikawa disclose a variable dispersion compensator at a node, where an amplifier is used in conjunction with the compensator to amplify the received signal after the signal has traveled a length of fiber (fig. 10 and paragraphs 63-65). It would have been obvious to one of ordinary skill in the art at the time of the invention to further place amplifiers after the DCF compensators of Ishikawa since DCF fiber is also a length of fiber that contributes loss to the signal.

Regarding claim 14, the combination of Colbourne et al. and Ishikawa disclose the dispersion compensation system of claim 13, wherein the DEM comprises a plurality of dispersion enhancement fibers each having a defined positive dispersion per unit length, each of the dispersion enhancement fibers having a different length (Ishikawa: fig. 13 and paragraph 0072).

Regarding claim 15, the combination of Colbourne et al. and Ishikawa disclose the dispersion compensation system of claim 14, wherein the DEM is operable to selectively couple one or more of the dispersion enhancement fibers together to form an optical path coupling the optical fiber to the DCM through the selected one or more of the dispersion enhancement fibers (Ishikawa: fig. 13 and paragraph 0072).

Regarding claim 16, Colbourne et al. disclose a dispersion enhancement module (fig. 13b, element R1 and fig. 19, element 191) adapted to be optically coupled to a dispersion compensation module having a fixed negative dispersion (fig. 13b, element R3 and fig. 19, element 192 and col. 4, lines 53-61), the dispersion enhancement module comprising: an optical input adapted to couple to an optical transport fiber and an optical output adapted to couple to the dispersion compensation module, wherein optical signals from the optical output have a positive dispersion substantially equal to a sum of positive dispersion of the transport fiber and

positive dispersion of the optical path (col. 1, lines 7-9 and lines 18-27, and col. 4, lines 31-61 and col. 9, line 64 to col. 10, line 61). Colbourne et al. do not disclose the dispersion enhancement module comprising a plurality of dispersion enhancement fibers. Ishikawa discloses a variable dispersion compensation device using switched DCFs and fixed DCFs over various positive and negative compensation values, the switched DCFs controlled by a controller (fig. 1 and fig. 13 and paragraph 0072). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the fixed and variable dispersion compensation devices of Ishikawa for the fixed and variable compensators of Colbourne et al. since dispersion compensation fiber is conventional and since the etalons of Colboume require dimensions and free spectral range that are dependent on channel spacing of a multi-wavelength signal. Ishikawa also disclose a plurality of optical switches coupling the optical input and the dispersion enhancement fibers, the optical switches operable to form an optical path between the optical input and the optical output, the optical path passing through one or more of the dispersion enhancement fibers (fig. 13 and paragraph 0072).

Regarding claim 17, the combination of Colboume et al. and Ishikawa disclose the dispersion enhancement module of claim 16, wherein a magnitude of the positive dispersion of the optical signals is substantially equal to a magnitude of the negative dispersion of the dispersion compensation module (col. 1, lines 7-9 and lines 18-27, and col. 4, lines 31-61 and col. 9, line 64 to col. 10, line 61).

Regarding claim 19, the combination of Colboume et al. and Ishikawa disclose the dispersion enhancement module of claim 16, further comprising a controller operable to: determine the negative dispersion of the dispersion compensation module, determine the positive dispersion of the optical transport fiber, and configure the switches such that a magnitude of the positive dispersion of the optical signals from the optical output is substantially

equal to a magnitude of the negative dispersion of the dispersion compensation module (Colbourne et al.: col. 11, lines 3-22 and Ishikawa: fig. 13 and paragraph 0072).

Regarding claim 20, the combination of Colbourne et al. and Ishikawa disclose the dispersion enhancement module of claim 16, wherein the switches are further operable to optically couple the optical input and the optical output such that the optical path bypasses the dispersion enhancement fibers (Ishikawa: fig. 13 and paragraph 0072).

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Colbourne et al. (US Patent No. 6654564) in view of Feinberg (US Patent Application Publication No. 2003/0031433).

Regarding claim 12, Colbourne et al. disclose the method of claim 9, and the controller determining the correct dispersion compensation adjustment (col. 11, lines 3-22), but do not disclose detecting a switch from the transport fiber to a backup optical transport fiber, the backup transport fiber having a third positive dispersion; and reconfiguring the dispersion enhancement module to provide fourth positive dispersion, the sum of the third positive dispersion and the fourth positive dispersion substantially equal to the magnitude of the negative dispersion. Feinberg disclose a protected optical transmission system where different dispersion compensation values are used for each of the received working and protection signals (fig. 4, elements 420, 425 and 322 and paragraphs 0037 and 0041). It would have been obvious to one of ordinary skill in the art at the time of the invention that a protection switched optical input could be supplied to the dispersion compensation system of Colbourne et al., and that the controller of Colbourne et al. would detect a change in the needed amount of dispersion compensation if the incoming fiber signal was switched due to a protection switch, in order to provided the advantage of adding a protected input to the Colbourne et al. system without

having to duplicate the dispersion compensation system of Colbourne et al. since it would automatically adjust the dispersion compensation for either of the working or protect input signal.

8. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Colboume et al. (US Patent No. 6654564) in view of Ishikawa (US Patent Application Publication No. 2002/0003646) as applied to claims 4, 6, 7, 10, 13-17, 19 and 20 above, and further in view of Feinberg (US Patent Application Publication No. 2003/0031433).

Regarding claim 18, the combination of Colboume et al. and Ishikawa disclose the dispersion enhancement module of claim 16, and the controller determining the correct dispersion compensation adjustment (Colbourne et al.: col. 11, lines 3-22), but do not disclose a controller operable to: detect a switch from the optical transport fiber to a backup optical transport fiber; determine a difference in magnitudes of the negative dispersion of the dispersion compensation module and a positive dispersion of the backup optical transport fiber; and reconfigure the optical switches such that the optical path has a positive dispersion equal to the difference in the magnitudes. Feinberg disclose a protected optical transmission system where different dispersion compensation values are used for each of the received working and protection signals (fig. 4, elements 420, 425 and 322 and paragraphs 0037 and 0041). It would have been obvious to one of ordinary skill in the art at the time of the invention that a protection switched optical input could be supplied to the dispersion compensation system of Colbourne et al., and that the controller of Colbourne et al. would detect a change in the needed amount of dispersion compensation if the incoming fiber signal was switched due to a protection switch, in order to provided the advantage of adding a protected input to the Colbourne et al. system without having to duplicate the dispersion compensation system of Colbourne et al. since it

would automatically adjust the dispersion compensation for either of the working or protect input signal.

Conclusion

9. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2600.

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